TM 11-6625-670-15

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

ORGANIZATIONAL, DS, GS
AND DEPOT MAINTENANCE MANUAL
INCLUDING REPAIR PARTS
AND SPECIAL TOOL LISTS

METER, FLUTTER AND WOW ME-254A/U

HEADQUARTERS, DEPARTMENT OF THE ARMY
AUGUST 1965

WARNING

Be careful when working on the 115-volt ac line connections. Serious injury or death may result from contact with these terminals.

This manual contains material prepared by Varo Inc. Electrokinetics Division

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TECHNICAL MANUAL
No. 11–6625–670–15

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., *26 July 1965*

Organizational, DS, GS, and Depot Maintenance Manual

METER, FLUTTER AND WOW ME–254A/U

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*This manual supersedes TM 11–6625–567–12P, 17 October 1963, and TM 11–6625–567–45P, 8 October 1963.

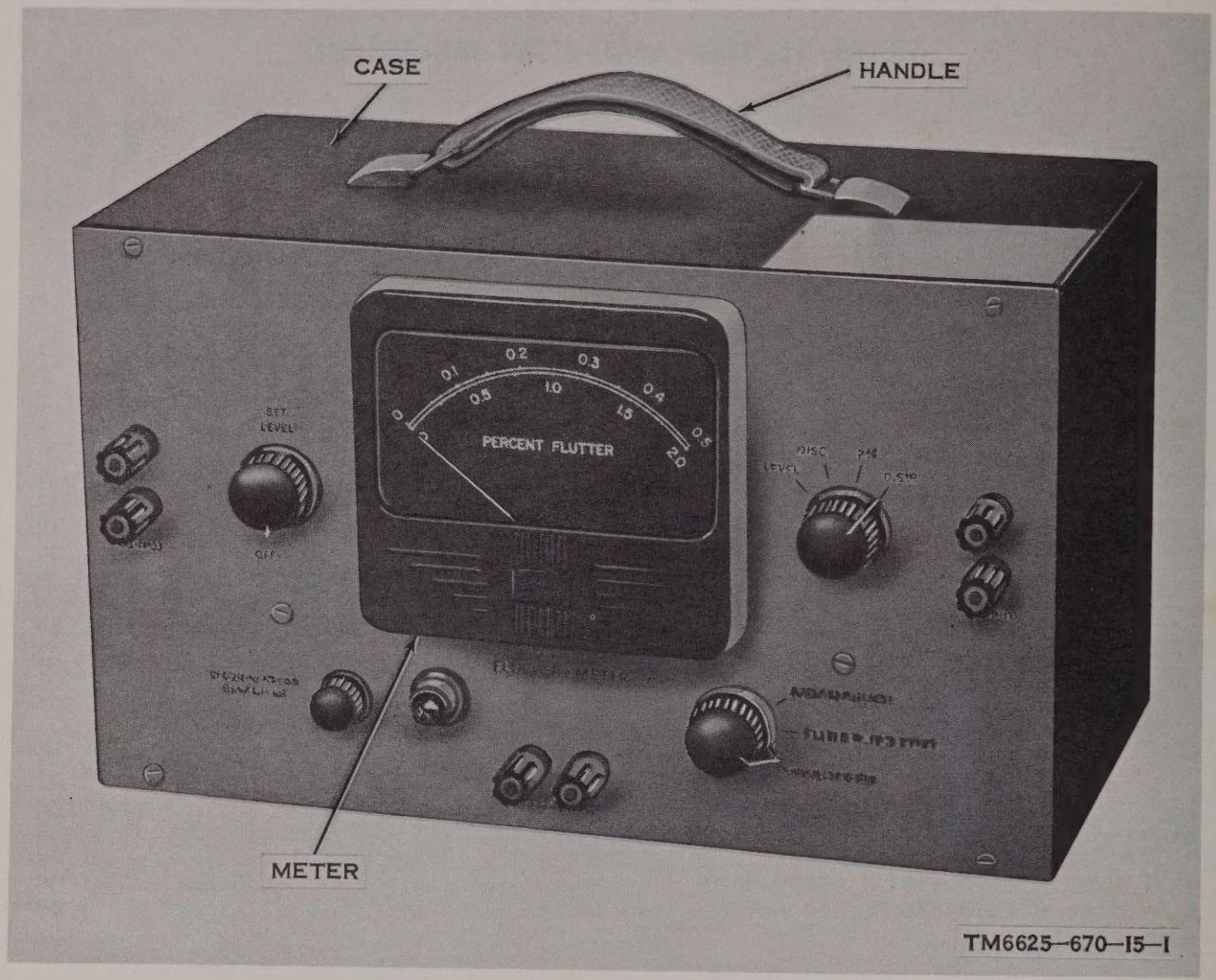


Figure 1-1. Meter, Flutter and Wow ME-254A/U.

CHAPTER 1

INTRODUCTION

1–1. Scope

a. This manual provides operating and maintenance information for Meter, Flutter and Wow ME–254A/U. This is a first edition manual containing preliminary and unreviewed information compiled by the manufacturer of the equipment. It also contains operator and organizational maintenance information. The information contained herein should be used with judicious caution until the manual is replaced by a revised edition. The ME–254A/U is shown in figure 1–1.

b. The basic issue items list is in appendix II, the maintenance allocation chart (MAC) is in appendix III, and the general support and depot maintenance repair parts and special tools list is in appendix IV.

1–2. Index of Publications

Refer to the latest issue of DA Pam 310–4 to determine whether there are new editions, changes, or additional publications pertaining to the equipment. DA Pam 310–4 is an index of current technical manuals, technical bulletins, supply manuals, supply catalogs, supply bulletins, lubrication orders, and modification work orders available through publications supply channels. The index lists the individual parts (–10, –20, –35P, etc.) and the latest changes to and revisions of each equipment publication.

1–3. Forms and Records

a. Reports of Maintenance and Unsatisfactory Equipment. Use equipment forms and records in accordance with instructions in TM 38–750.

b. Report of Damaged or Improper Shipment. Fill out and forward DD Form 6 (Report of Damaged or Improper Shipment) as prescribed in AR 700–58 (Army), NAVSANDA Publication 378 (Navy), and AFR 71–4 (Air Force).

c. Reporting of Equipment Manual Improvements. The direct reporting of errors, omissions, and recommendations for improving this manual by the individual user, is authorized and encouraged. DA Form 2028 (Recommended Changes to DA Publications) will be used for reporting these improvements. This form will be completed using pencil, pen, or typewriter and forwarded direct to Commanding General, U.S. Army Electronics Command, ATTN: AMSEL–MR–(NMP)–MA, Fort Monmouth, N.J., 07703.

CHAPTER 2

METER, FLUTTER AND WOW ME–254A/U FUNCTIONING

2–1. General Description

Meter, Flutter and Wow ME–254A/U is a direct reading instrument designed to measure the flutter and wow frequencies found in tape recorders, turntables, disk recorders, and film recorders. The direct readings may be used for general maintenance or production testing. For research and development work, two output terminals are provided for analyzing the characteristic of the flutter. The output terminals on the front panel are provided for oscilloscopic display, and a test point mounted on the rear chassis apron provides direct current (dc) response so that drift as well as wow and flutter may be recorded on a direct recorder with suitable amplifiers.

2–2. Circuit Operation

The circuit utilizes the basic principles involved in the detection of frequency-modulation (fm) signals. This includes the use of a limiter amplifier to prevent the amplitude-modulation (am.) components from producing an indication in the output circuits. Such am., for example, may be introduced by dropouts in the magnetic coating of recording tape, clicks and pops in records, and light fluctuations in photorecording. A frequency discriminator demodulates the flutter signals and presents them to an averaging-type meter circuit calibrated to read the root mean square value of sinewave modulation. Suitable filters are provided to examine the wow and flutter spectra separately. A regulated power supply and an internal 3,000-cycle per second (cps) carrier oscillator complete the circuit sections. Figure 2–1 illustrates the functioning of the ME–254A/U in block diagram form. A two-section high-pass resistance-capacitance (rc) filter connects the INPUT terminals with the SET LEVEL control. The function of the filter is to remove the low frequency components from the incoming flutter modulated 3-kilocycle (kc) tone. The network attenuates frequencies below 1,000 cps. The signal is next amplified in a class A amplifier stage and feeds a symmetrical double-diode limiter. This circuitry has been designed for symmetrical clipping of the signal to avoid introducing phase modulation components on the main signal due to changes in the zero-axis crossings associated with nonsymmetrical limiting.

a. The limited signal is amplified and fed into the pentode section of the 6U8, which acts as the amplifier of the Foster-Seeley discriminator. The detected flutter signal is taken from the 6AL5 detector and passed through appropriate filters to remove the carrier signal. Front panel control DISCRIMINATOR CENTERING allows the discriminator secondary tuning to be adjusted to the frequency of the incoming signal. Under most conditions, this control will be adjusted for 3,000-cps operation, which is the frequency of the factory calibrated internal-carrier oscillator. The control may require adjustment when using a prerecorded signal that is being played back at a slightly different speed, resulting in off-frequency operation. The bandwidth of the discriminator is such that a flutter modulation signal of 250 cps is attenuated no more than 3 decibles (db) from a reference frequency of 15 cps. Sufficient response is available to identify frequencies to 350 cps with an oscilloscope.

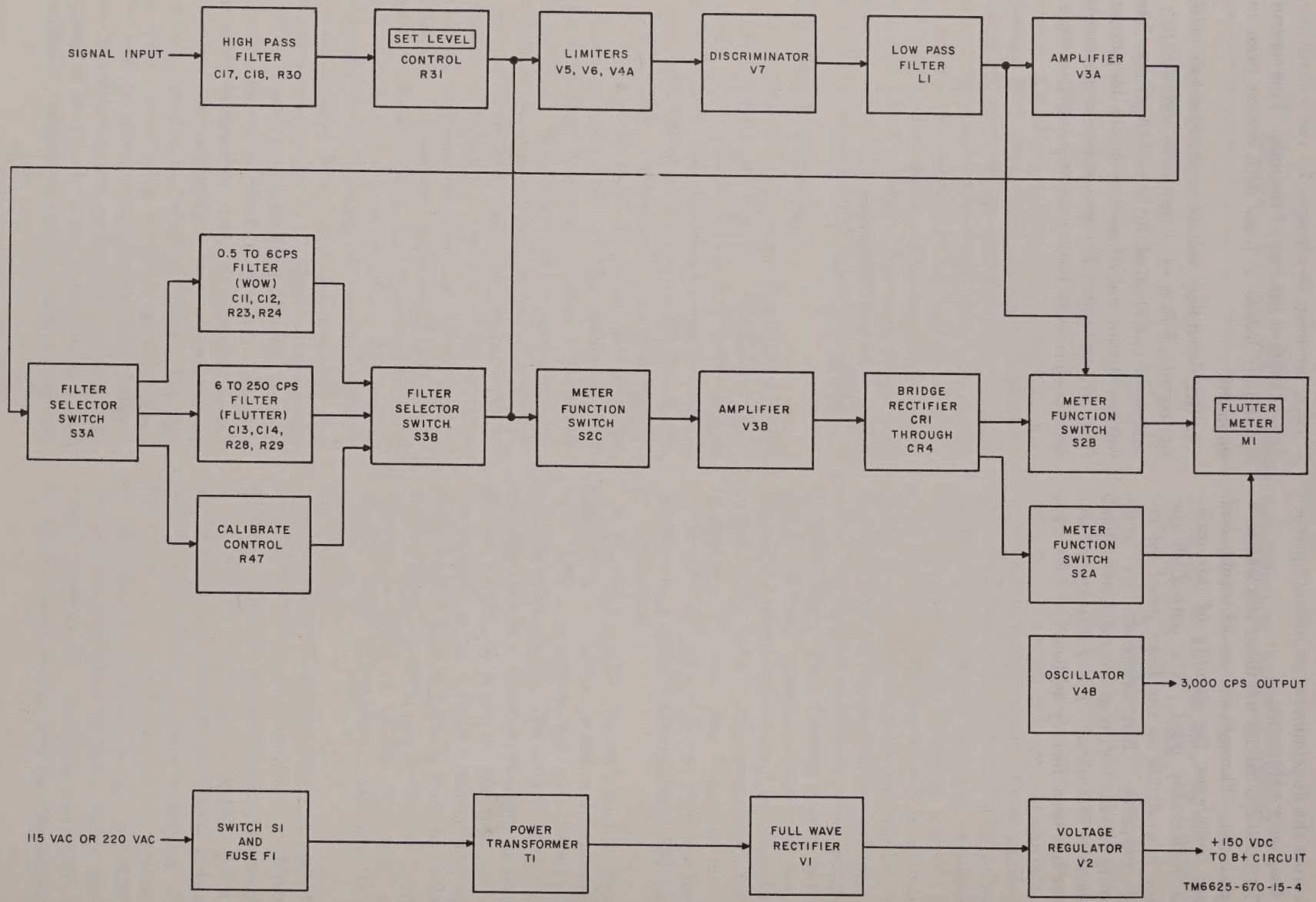
b. The demodulated flutter signal is amplified and fed to a selector switch which permits the wow, flutter, or overall wow plus flutter components to be measured. The cathode of this amplifier tube is also connected through an isolating resistor to the test point on the rear apron for recording purposes. While a small positive quiescent potential is on this point, it can be bucked off by the appropriate centering controls on the direct recorder amplifier or by use of a small series battery. This dc response is valuable for drift measurements.

c. The filters to separate the wow and flutter components consist of three-section rc filters designed to give the sharpest knee characteristics. The crossover frequency is 6cps. After the signal has passed through the filters, it is again amplified and fed to a diode averaging circuit. Full-scale meter sensitivities of 2.0 percent and 0.5 percent are provided on the ME–254A/U. The selector switch for the flutter range also provides a position for monitoring the input signal for proper level setting and for connecting the

meter across the discriminator to indicate proper center frequency adjustment.

d. The 3,000-cps carrier oscillator is a standard Hartley circuit. Through the use of toroids and stabilized techniques, the stability of this oscillator is remarkably good. The output of the oscillator is available on the front panel for recording purposes. Approximately 2.0 volts alternating current (ac) is generated across a load impedance of 200 ohms. The frequency of the oscillator has been factory adjusted to 3,000 cps. It may, however, be changed by the screwdriver control shaft at the rear of the unit. This control is normally locked in place with cement prior to shipment.

e. Regulated high voltage is provided by a voltage regulated flow discharge tube and will provide stable operation of the ME–254A/U over line voltage fluctuations of plus or minus 15 percent from 117 volts ac. The power transformer will operate on a 50- to 400-cps input power frequency.


SIGNAL INPUT
HIGH PASS FILTER C17, C18, R30
SET LEVEL CONTROL R31
LIMITERS V5, V6, V4A
DISCRIMINATOR V7
LOW PASS FILTER L1
AMPLIFIER V3A
0.5 TO 6CPS FILTER (WOW) C11, C12, R23, R24
FILTER SELECTOR SWITCH S3A
6 TO 250 CPS FILTER (FLUTTER) C13, C14, R28, R29
CALIBRATE CONTROL R47
FILTER SELECTOR SWITCH S3B
METER FUNCTION SWITCH S2C
AMPLIFIER V3B
BRIDGE RECTIFIER CR1 THROUGH CR4
METER FUNCTION SWITCH S2B
FLUTTER METER M1
METER FUNCTION SWITCH S2A
OSCILLATOR V4B
3,000 CPS OUTPUT
115 VAC OR 220 VAC
SWITCH S1 AND FUSE F1
POWER TRANSFORMER T1
FULL WAVE RECTIFIER V1
VOLTAGE REGULATOR V2
+150 VDC TO B+ CIRCUIT

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CHAPTER 3

OPERATION

3–1. General

Meter, Flutter and Wow ME–254A/U operates by virtue of measuring the degree of frequency modulation which is present on the 3,000-cycle signal fed to the INPUT terminals. Therefore, it is necessary first, in order to utilize the instrument, that a 3,000-cycle signal be obtained which has been passed through the recording and reproducing media to be tested. In the case of a tape system, the 3,000-cycle signal can be obtained in a relatively simple manner. With the usual tape recorder, the output from the OSCILLATOR terminals on the front panel is fed to the input of the tape recorder, and the 3-kc signal is recorded on the tape in the normal manner. The tape is then rewound and the output signal from playing the recorded tape is fed to the INPUT terminals of the ME–254A/U. In this way, the inherent flutter, both of the tape recording process and the tape playback process of the particular tape machine under test, will be measured. If the tape machine has a monitor head, the measurement of flutter is made even simpler. The procedure is as follows: The output from the OSCILLATOR terminals is fed to the input jack of the tape recorder and is recorded on the tape at normal amplitude. The output from the monitor provision of the tape recorder then is fed to the INPUT terminals of the ME–254A/U. In this way, the flutter of the tape system may be measured at the same time that the signal is being recorded. To make a flutter measurement on a disk or film system, it is normal that the 3000-cycle signal be recorded on a machine separate from the playback instrument. Thus, two problems are interposed: the difficulty of obtaining a disk or film record that is actually on 3,000 cycles, and isolating the flutter of the recording media from the flutter of the playback media. This is to say that it is extremely difficult to make a record in which the flutter recorded into the record is less than 0.1 percent. Also, it is a less difficult problem to make a disk playback turntable with flutter less than 0.1 percent than it is to make a recording system with an equivalent flutter level; this is true because the variable force components of a disk recording system are much greater than in the equivalent disk playback system.

3–2. Making Measurement

(fig. 3–1)

Turn on the instrument and allow it to warm up for at least 3 minutes. The following procedures are necessary to make a flutter measurement:

a. Connect the INPUT terminals of the ME–254A/U to the flutter modulated 3,000-cps output signal of the recording of playback system to be checked. With the function control on LEVEL, adjust the SET LEVEL control until the meter reads midscale. The input terminal voltage required to accomplish this is approximately 0.1 volt; this will provide plus and minus 20 db of limiting. If the input signal is below this level, satisfactory operation may be obtained with a signal indicating 0.1 percent on the 0.5 percent scale with a corresponding reduction in the ability of the limiter to remove downward amplitude modulation. However, most records and tapes are such that this procedure will not introduce errors.

b. Rotate the function switch to DISC to check for center frequency tuning for the discriminator. A zero deflection of the meter indicates the discriminator is tuned to the same frequency as the incoming signal. A positive indication means the input signal is above the center frequency of the discriminator, and a negative indication shows a lower incoming frequency. Adjust the DISCRIMINATOR CENTERING control for zero reading.

c. The function switch may be set to the 2.0% or 0.5% position to measure the wow, flutter, or overall wow and flutter frequencies with the desired setting of the bandwidth switch. The indicated flutter is measured in terms of the rms frequency deviation of the flutter or wow, expressed as a percentage of the average signal.

3–3. General Information

a. The instrument will give a meter indication when the INPUT terminals are open and the SET LEVEL control is turned up. This is caused by the fact that extraneous signals picked up by the

INPUT terminals are amplified, and those components lying within the bandwidth of the ME–254A/U are detected. It is characterized by a rather steady reading of the meter and, when observing the OUTPUT terminals with an oscilloscope, a random, evenly distributed noise spectrum is seen. The same effect sometimes occurs as a result of thermal voltages present in the output amplifiers feeding the ME–254A/U without the presence of the 3,000-cps signal. Upon applying the signal, however, the signal plus noise-to-noise ratio is such that only the flutter is indicated. This phenomenon can easily be verified by observing the flutter signal with an oscilloscope and then removing the 3,000-cps input signal, but still leaving the amplifiers connected to the INPUT terminals.

b. In those cases where the incoming signal is higher in frequency than the 3,000-cps internal oscillator, it is possible to obtain an estimate of the input frequency by first connecting the OSCILLATOR output to the INPUT terminals and adjusting the DISCRIMINATOR CENTERING control to a zero meter reading with the function switch at DISC. Substitute the frequency to be measured for the carrier signal. An indication of 0.1 percent on the 0.5 percent scale indicates that the signal is approximately 2½ percent higher than the 3,000-cps reference.

c. Because of the relative broadband response of the ME–254A/U discriminator coils and the tuning range of the DISCRIMINATOR CENTERING control, it is possible to accept input signals varying as much as plus or minus 5 percent away from the nominal, or 3,000-cps input frequency without affecting the readings by more than 5 percent.

3–4. Calibration

Each instrument is carefully calibrated at the factory before shipment. Since accurate calibration of a flutter measuring device requires specialized signal generating equipment and reference standards, it is not practicable to calibrate the ME–254A/U in the field from a primary reference. However, calibration of the ME–254A/U from a standard tape or disk is easily accomplished. Therefore, a standard calibration tape and disk with an accurately determined 1.5-percent *peak* flutter signal recorded on a 3,000-cycle carrier is provided. It should be pointed out that the ME–254A/U will measure the rms value of this signal, or approximately 1.1. percent. If the calibration tape or disk is played on a machine having reasonably low flutter and wow content, the errors in this method of calibration are quite small, as the total reading will be the rms value of the calibration signal and the inherent flutter of the playback machine. Under these circumstances, the error introduced in the calibration signal will be less than 2 percent. Both the standard flutter tape and the standard flutter disk contain a 3,000-cycle signal with no intentional modulation. This unmodulated 3,000-cycle signal is held to as low inherent flutter as practicable; every effort is made in these recordings to keep the inherent flutter and wow below 0.1 percent peak.

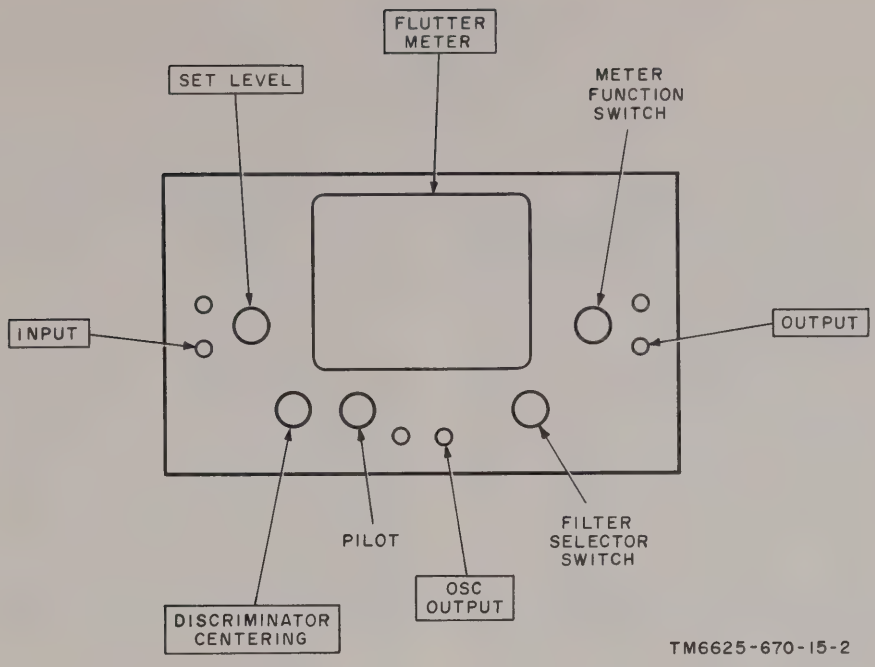

Figure 3–1. ME–254A/U, controls and indicators.

3–5. Specifications

Operating frequency	3,000-cps established factory calibration.
Discriminator bandwidth	The bandwidth of the discriminator is sufficient to allow sidebands up to 250 cps to be demodulated with no more than 3 db of attenuation with reference to 15 cps.
Input signal required	0.1-volt signal provides ±20 db limiting. Full limiting can be obtained with as little as 0.1-volt rms signal input.
Input impedance	100,000 ohms.
Scale ranges	2% and 0.5% full scale. Rms calibration on side-wave modulation.
Accuracy	10% within bandwidth restrictions.
Bandwith selection	0.5 to 6 cps, 6 cps to 250 cps, and 0.5 to 250 cps.
Outputs	*a.* Provision for dc to 250 cps output on rear apron for direct writing recorder and amplifier.
	b. Front panel terminals for observing flutter and wow components on oscilloscope.
Tube complement	One 6U8, two 12AT7, one 6AL5, one 6X4, one OA2.
Line power	117 volts, 50–400 cps, 30 watts.
Dimensions	7-in. by 12-in. by 6-in. steel case.
Weight	10½ pounds.
Shipping weight	14 pounds.

3–6. Accessories

a. Flutter tape, part No. 62–1002A—600 feet on 7-inch plastic reel, full width, 7.5 ips, first half 3 kc unmodulated, balance 1.5 percent peak flutter at 75-cps modulation frequency.

d. Flutter record part No. 37–1002—12-inch 33⅓ vinyl pressing with three cuts as follows:

(1) 3,000-cps unmodulated for flutter measurements.

(2) 3,000-cps modulated 1.5 percent peak at 75 cps.

(3) Blank groove for rumble testing.

CHAPTER 4

MAINTENANCE

4–1. Scope of Operator's Maintenance

The maintenance duties assigned to the operator of Flutter and Wow Meter ME–254A/V are listed below, together with a reference to the paragraphs covering the specific maintenance functions. The duties assigned do not require materials other than those listed in paragraph 4–2.

a. Daily preventive maintenance checks and services (para. 4–5).

b. Weekly preventive maintenance checks and services (para. 4–6).

c. Cleaning (para. 4–7).

4–2. Materials Required for Operator's Maintenance

The following materials are required to perform the operator's preventive maintenance.

a. Cleaning compound (FSN 7930–395–9542).

b. Lint free cloth (FSN 8305–170–5062).

c. Small soft bristle brush (FSN 8020–245–4509).

4–3. Operator's Preventive Maintenance

Operator's preventive maintenance is the systematic care, servicing, and inspection of equipment to prevent the occurrence of trouble, to reduce downtime, and to assure that the equipment is serviceable.

a. Systematic Care. The procedures given in paragraphs 4–5, 4–6, and 4–7 cover routine systematic care and cleaning essential to proper upkeep and operation of the equipment.

b. Preventive Maintenance Checks and Services. The preventive maintenance checks and services charts (paras. 4–5 and 4–6) outline functions to be performed at specific intervals. These checks and services are to maintain Army electronic equipment in serviceable condition; that is, in good general (physical) condition and in good operating condition. To assist operators in maintaining serviceability, the charts indicate what to check, how to check, and the normal conditions. The *References* column lists the paragraphs that contain supplementary information. If the defect cannot be remedied by the operator, higher level maintenance is required. Records and reports of these checks and services must be made in accordance with the requirements set forth in TM 38–750.

4–4. Operator's Preventive Maintenance Checks and Services Periods

a. Daily. Preventive maintenance checks and services of the equipment are required daily while the equipment is in use. If the equipment is being maintained in a *standby* (ready for immediate operation) condition, the daily checks and services should be performed once each week. Paragraph 4–5 specifies the checks and services that must be accomplished daily and when the equipment is initially placed in service or removed from service.

b. Weekly. Perform the maintenance functions indicated in the weekly preventive maintenance checks and services chart (para. 4–6) once each week. Equipment in *limited storage* (requires service before operation) does not require weekly maintenance.

4–5. Daily Preventive Maintenance Checks and Services Chart

Sequence No.	Item	Procedure	References
1	Overall equipment	*a.* Check to see that exposed metal surfaces are free of dust, dirt, and moisture.	*a.* Para. 4–7 *a*, *b*, and *c*.
		b. Check to see that meter windows and indicator jewels are free of dust, dirt, and moisture.	*b.* Para. 4–7*d*.
2	Exterior items	Check to see that switches, knobs, connectors, and indicators are secure.	
3	Operation	During operation, be alert for any unusual occurrences.	

4–6. Weekly Preventive Maintenance Checks and Services Chart

Sequence No.	Item	Procedure	References
1	Exterior items	Check to see that handle is firmly secured and not damaged	
2	Indicator jewels and meter window.	Check to see that indicator jewels and meter window are free of cracks, scratches, and discoloration.	
3	Controls and switches	Set controls and switches to each of their possible positions. Controls and switches move freely without binding or scraping and with positive action.	

4–7. Cleaning and Touchup Painting

Inspect the exterior of the equipment. The exterior surfaces should be free of dust, dirt, grease, and fungus.

a. Remove dust and loose dirt with a clean, soft, lint free cloth.

***Warning:* Cleaning compound (FSN 7930–395–9542) is flammable and its fumes are toxic. Provide adequate ventilation. *Do not* use near a flame.**

b. Remove grease, fungus, and ground-in dirt with a cloth dampened (not soaked) with cleaning compound; dry thoroughly.

c. Remove dust or dirt from connectors with a brush.

***Caution:* Do not press on the meter face (glass) when cleaning; the meter may become damaged.**

d. Clean the meter face (glass); use a soft, clean, lint free cloth. If dirt is difficult to remove, dampen the cloth with water; mild soap may be used for more effective cleaning. Permit the meter face to air-dry; do not dry the meter face (glass) with a cloth.

4–8. Scope of Organizational Maintenance

The maintenance duties assigned to organizational maintenance personnel of the equipment are listed below, together with a reference to the paragraphs covering the specific maintenance functions.

a. Monthly preventive maintenance checks and services (para. 4–12).

b. Cleaning and touchup painting (para. 4–7).

4–9. Materials and Test Equipment Required for Organizational Maintenance

a. Cleaning compound (FSN 7930–395–9542).

b. Lint free cloth (FSN 8305–170–5062).

c. Small soft bristle brush (FSN 8020–245–4509).

d. Sandpaper (No. 000).

4–10. Organizational Preventive Maintenance

a. Organizational preventive maintenance is the systematic care, inspection, and servicing of equipment to maintain it in serviceable condition, prevent breakdowns, and assure maximum operational capability. Preventive maintenance is the responsibility of all levels of maintenance concerned with the equipment and includes inspection, testing, and repair or replacement of parts, subassemblies, or units that inspection and tests indicate would probably fail before the next scheduled periodic service. Preventive maintenance checks and services of the equipment at the organizational maintenance level are made monthly at the same time as the daily (para. 4–5) and weekly (para. 4–6) checks and services unless otherwise directed by the commanding officer.

b. Maintenance forms and records to be used and maintained on this equipment are specified in TM 38–750.

4–11. Monthly Maintenance

Perform the maintenance functions indicated in the monthly preventive maintenance checks and services chart (para. 4–12). A month is defined as approximately 30 calendar days of 8-hour-per-day operation. If the equipment is operated 16 hours a day, the monthly preventive maintenance checks and services should be performed at 15-day intervals. Adjustment of the maintenance interval must be made to compensate for any unusual operating conditions. Equipment maintained in a *standby* (ready for immediate operation) condition must have monthly preventive maintenance checks and services. Equipment in *limited storage* (requires service before operation) does not require monthly preventive maintenance.

4–12. Monthly Preventive Maintenance Checks and Services Chart

Sequence No.	Item	Procedure	References
1	Publications	*a.* Check to see that pertinent publications are complete, usable, and without missing pages. *b.* See that changes pertinent to equipment are on hand (DA Pam 310–4).	
2	Modification work orders.	Check DA Pam 310–4 to determine if new applicable MWO's have been published. All URGENT MWO's must be applied immediately. All NORMAL MWO's must be scheduled.	
3	Completeness	Check to see that equipment is complete.	
4	Clean	Clean interior surfaces with lint free cloth moistened with cleaning compound.	Para. 4–13.
5	Pilot lamp	Check to see that pilot lamp DS1 lights. Replace if necessary.	
6	Wiring	Check wiring for cracks or broken insulation; check for loose connections.	
7	Preservation	*a.* Check interior and exterior surfaces for evidence of fungus, rust, and corrosion.	*a.* None.
		b. Remove rust and corrosion from metal surfaces by lightly sanding with fine sandpaper. Brush two thin coats of paint on the bare metal to protect it from further corrosion.	*b.* TB SIG 364.

APPENDIX I

REFERENCES

Following is a list of references available to the maintenance personnel of Meter, Flutter and Wow ME–254A/U:

DA Pam 310–4	Index of Technical Manuals, Technical Bulletins, Supply Manuals (Types 4, 6, 7, 8, and 9), Supply Catalogs (Type CL), Supply Bulletins, Lubrication Orders, and Modification Work Orders
SB 38–100	Preservation, Packaging, and Packing Materials, Supplies, and Equipment Used by the Army
TB SIG 364	Field Instructions for Painting and Preserving Electronics Command Equipment
TM 11–401	Elements of Signal Photography
TM 11–2535B	Meter Test Set TS–682A/GSM–1
TM 11–2649	Audio Oscillator TS–421/U (Hewlett-Packard Model 205–AG)
TM 11–6625–203–12	Operator and Organizational Maintenance: Multimeter AN/URM–105, Including Multimeter ME–77/U
TM 38–750	Army Equipment Record Procedures

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APPENDIX II

BASIC ISSUE ITEMS

Section I. INTRODUCTION

A2–1. General

This appendix lists items supplied for initial operation. The list includes material issued as part of the major end item. The list includes all items authorized for basic operator maintenance of the equipment. End items of equipment are issued on the basis of allowances prescribed in equipment authorization tables and other documents that are a basis for requisitioning.

A2–2. Columns

Columns are as follows:

a. Federal Stock Number. This column lists the 11-digit Federal stock number.

b. Designation by Model. Not used.

c. Description. Nomenclature or the standard item name and brief identifying data for each item are listed in this column. When requisitioning, enter the nomenclature and description.

d. Unit of Issue. The unit of issue is each unless otherwise indicated and is the supply term by which the individual item is counted for procurement, storage, requisitioning, allowances, and issue purposes.

e. Expendability. Nonexpendable items are indicated by NX. Expendable items are not annotated.

f. Quantity authorized. Under "Items Comprising an Operable Equipment," the column lists the quantity of items supplied for the initial operation of the equipment.

g. Illustration. Not used.

FEDERAL STOCK NUMBER	DESIGNATION BY MODEL	DESCRIPTION	UNIT OF ISSUE	EXP	QTY AUTH	ILLUSTRATION	
						FIGURE NO.	ITEM NO.
6625-987-8527		METER, FLUTTER AND WOW ME254A/U: 100,000 ohms input impedance, power requirements 117 volts .50-400 cps, 300 watts. Provides an accurate method of visual indication of flutter and wow of all types of tape recorders and play back equipment including 33-1/3, 45 and 78 rpm discs. Also 16 and 35 mm sound film mechanism					
		ITEMS COMPRISING AN OPERABLE EQUIPMENT					
ORD THRU AGC		TECHNICAL MANUAL TM 11-6625-670-15			2		
		METER, FLUTTER AND WOW ME254A/U (Basic component)		NX	1		
		RUNNING SPARE ITEMS					
		NO PARTS AUTHORIZED FOR STOCKAGE AT OPERATOR'S LEVEL					

APPENDIX III

MAINTENANCE ALLOCATION

Section I. INTRODUCTION

A3–1. General

a. This appendix assigns maintenance functions to be performed on components, assemblies, and subassemblies by the lowest appropriate maintenance category.

b. Columns in the maintenance allocation chart are as follows:

(1) *Part or component.* This column shows only the nomenclature or standard item name. Additional descriptive data are included only where clarification is necessary to identify the component. Components, assemblies, and subassemblies are listed in top-down order. That is, the assemblies which are part of a component are listed immediately below that component, and subassemblies which are part of an assembly are listed immediately below that assembly. Each generation breakdown (components, assemblies, or subassemblies) is listed in disassembly order or alphabetical order.

(2) *Maintenance function.* This column indicates the various maintenance functions allocated to the categories.

(*a*) *Service.* To clean, to preserve, and to replenish lubricants.

(*b*) *Adjust.* To regulate periodically to prevent malfunction.

(*c*) *Inspect.* To verify serviceability and detect incipient electrical or mechanical failure by scrutiny.

(*d*) *Test.* To verify serviceability and to detect incipient electrical or mechanical failure by use of special equipment such as gages, meters, etc.

(*e*) *Replace.* To substitute serviceable components, assemblies, or subassemblies, for unserviceable components, assemblies, or subassemblies.

(*f*) *Repair.* To restore an item to serviceable condition through correction of a specific failure or unserviceable condition. This function includes but is not limited to welding, grinding, riveting, straightening, and replacement of parts other than the trial and error replacement of running spare type items such as fuses, lamps, or electron tubes.

(*g*) *Align.* To adjust two or more components of an electrical system so that their functions are properly synchronized.

(*h*) *Calibrate.* To determine, check, or rectify the graduation of an instrument, weapon, or weapons system, or components of a weapons system.

(*i*) *Overhaul.* To restore an item to *completely serviceable* condition as prescribed by serviceability standards. This is accomplished through employment of the technique of "Inspect and Repair Only as Necessary" (IROAN). Maximum utilization of diagnostic and test equipment is combined with minimum disassembly of the item during the overhaul process.

(*j*) *Rebuild.* To restore an item to a standard as near as possible to original or new condition in appearance, performance, and life expectancy. This is accomplished through the maintenance technique of complete disassembly of the item, inspection of all parts or components, repair or replacement of worn or unserviceable elements using original manufacturing tolerances and/or specifications, and subsequent reassembly of the item.

(3) *Operator, organizational, direct support, general support, and depot.* The symbol X indicates the categories responsible for performing that particular maintenance operation, but does not necessarily indicate that repair parts will be stocked at that level. Categories higher than those marked by X are authorized to perform the indicated operation.

(4) *Tools required.* This column indicates codes assigned to each individual tool equipment, test equipment, and maintenance equipment referenced. The grouping of codes in this column of the maintenance allocation chart indicates the tool, test, and maintenance equipment required to perform the maintenance function.

(5) *Remarks.* Entries in this column will be utilized when necessary to clarify any of the data cited in the preceding column.

c. Columns in the allocation of tools for maintenance functions are as follows:

(1) *Tools required for maintenance functions.* This column lists tools, test, and maintenance equipment required to perform the maintenance functions.

(2) *Operator, organizational, direct support, general support, and depot.* The dagger (†) symbol indicates the categories normally allocated the facility.

(3) *Tool code.* This column lists the tool code assigned.

A3–2. Maintenance by Using Organizations

When this equipment is used by Signal services organizations organic to theater headquarters or communication zones to provide theater communications, those maintenance functions allocated up to and including general support are authorized to the organization operating this equipment.

SECTION: II. MAINTENANCE ALLOCATION CHART

PART OR COMPONENT	MAINTENANCE FUNCTION	ECHELON O/C	ECHELON O	ECHELON DS	ECHELON GS	ECHELON D	TOOLS REQUIRED	REMARKS
ME-254A/U								
METER, FLUTTER AND WOW ME-254A/U	service	X						Clean
	adjust				X		4	
	inspect	X						Visual only
	test				X		1 thru 4	
	replace	X						
	repair				X		4	
	calibrate				X		1,2,4	
	overhaul					X	1 thru 4	

SECTION: III. ALLOCATION OF TOOLS FOR MAINTENANCE FUNCTIONS

TOOLS REQUIRED FOR MAINTENANCE FUNCTIONS	MAINTENANCE CATEGORY O/C	O	DS	GS	D	TOOL CODE	REMARKS
ME-254A/U (continued)							
AUDIO OSCILLATOR TS-421/U				X	X	1	
METER TEST SET TS-682/GSM-1				X	X	2	
MULTIMETER AN/URM-105				X	X	3	
TOOL KIT TK-87/U				X	X	4	

END

APPENDIX IV

REPAIR PARTS AND SPECIAL TOOL LISTS

Section I. INTRODUCTION

A4–1. General

This appendix includes a general support and depot maintenance special tools list.

a. The general support and depot maintenance repair parts and special tools list gives the repair parts authorized for general support maintenance and is a basis for requisitioning authorized parts. It is also a guide for depot maintenance in establishing initial levels of spare parts.

b. Columns are as follows:

(1) *Source code.* Source, maintenance, and recoverability codes indicate the supply service responsible for supply, the maintenance category at which an item is stocked, categories at which an item is installed or repaired, and whether an item is repairable or salvageable. The source code column is divided into four parts as follows:

(*a*) *Column A.* This column indicates the materiel code and designates the area of responsibility for supply. AR 310–1 defines the basic numbers used to identify the materiel code. If the part is Signal materiel responsibility, the column is left blank.

(*b*) *Column B.* This column indicates the point within the maintenance system where the part is available. "XL" applies to repair parts which are not procured or stocked, the requirement for which will be supplied by use of next higher component or assembly.

(*c*) *Column C.* This column indicates the lowest maintenance category authorized to install the part. H—General support maintenance.

(*d*) *Column D.* Not used.

(2) *Federal stock number.* This column lists the 11-digit Federal stock number.

(3) *Designation by model.* Not used.

(4) *Description.* Nomenclature or the standard item name and brief identifying data for each item are listed in this column. When requistioning, enter the nomenclature and description.

(5) *Unit of issue.* The unit of issue is each unless otherwise indicated and is the supply term by which the individual item is counted for procurement, storage, requisitioning, allowances, and issue purposes.

(6) *Expendability.* Nonexpendable items are indicated by NX. Expendable items are not annotated.

(7) *Quantity* incorporated in unit. This column lists the quantity of each part found in a given assembly, component, or equipment.

(8) *Direct support.* See paragraph A4–3.

(9) *General support.* An asterisk indicates that an item is not authorized for stockage but if required, may be requisitioned for immediate use only.

(10) *Depot.* The numbers in this column indicate quantities of repair parts authorized for depot maintenance and for initial stockage for maintenance, and for supply support to lower categories. The entries are based on the quantity required for rebuild of 100 equipments.

(11) *Illustration.* The "Item No." column lists the reference designations that appear on the part in the equipment. These same designations are also used on any illustrations of the equipment. The numbers in the "Figure No." column refer to the illustrations where the part is shown.

A4–2. Parts for Maintenance

When this equipment is used by Signal service organizations organic to the theater headquarters or communication zones to provide theater communications, those repair parts authorized up to and including general support are authorized for stockage by the organization operating this equipment.

A4–3. Stockage

No parts authorized for stockage at organizational and direct support levels.

SOURCE CODE A	B	C	D	FEDERAL STOCK NUMBER	DESIGNATION BY MODEL	DESCRIPTION	UNIT OF ISSUE	EXP	QTY IN UNIT	MAINTENANCE ALLOWANCE DIRECT SUPPORT	GENERAL SUPPORT	DEPOT	ILLUSTRATION FIG. NO.	ITEM NO.
				6625-987-8527		METER, FLUTTER AND WOW, ME-254A/U: 100,000 ohms input impedance, power requirements 117 volts .50-400 cps, 300 watts. Provides		NX						
						an accurate method of visual indication of flutter and wow of all types of tape recorders and play back equipment including								
a						33-1/3, 45 and 78 rpm discs, also 16 and 35 mm sound film mechanism Varo part No. 75203								
	X1	H				SUBASSEMBLY: Flutter indicator Varo part No. 75204			1					MP1
	X1	H				PANEL, FRONT: Varo part No. 75208			1				1-2	MP2
	X1	H				SCREW: Pan hd, 6-32 NC-2A, 3/8 in lg 56077-6			2					H1
		H		5310-579-0079		WASHER: Int tooth lock; MS35333-37			28		*	28		H2
	X1	H				NUT: Plain hex, 6-32N2-2B 10035			18		*	118		H3
	X1	H				CHASSIS: Varo No. 75223			1		*	4		MP3
		H		5930-754-7333		SWITCH ROTARY: 3 pole 3 positions; Chicago Telephone of Calif part No. 50284-Type 212			1		*	2.0	3-4	S3
		H		5930-754-7334		SWITCH, ROTARY: 3 pole, 4 position; Chicago Telephone Co. of Calif part No. 50285Type2-212			1		*	2.0	3-4	S2
		H		5905-759-3488		POTENTIOMETER: W/SPST switch; Chicago Telephone Co. of Calif part No. 36123Type GC-45			1		*	2.0	3-4	R31
		H		5905-279-2515		RESISTOR, FIXED COMPOSITION: RC20GF474K			3		*	6.0	3-4	R12 R33 R39
		H		5905-763-5380		RESISTOR, FIXED, FILM: 1/2 w, 330 k ohm, 1%; Dale Elec. part No. DCS1/2			1		*	2.0	3-4	R-8
		H		5905-192-3982		RESISTOR, FIXED COMPOSITION: RC20GF105K			1		*	2.0	3-4	R37
		H		5905-195-6806		RESISTOR, FXIED COMPOSITION: RC20GF102K			1		*	2.0	3-4	R10
		H		5905-295-3403		RESISTOR, FIXED COMPOSITION: RC20GF225K			1		*	2.0	3-4	R44
		H		5905-190-8876		RESISTOR, FIXED COMPOSITION: RC20GF153K			2		*	4.0	3-4	R4 R27
		H		5905-279-1757		RESISTOR, FIXED COMPOSITION: RC20GF152K			1		*	2.0	3-4	R45
		H		5905-195-6451		RESISTOR, FIXED COMPOSITION: RC20GF472K			2		*	4.0	3-4	R11 R32
		H		5905-295-3409		RESISTOR, FIXED COMPOSITION: RC20GF224K			1		*	2.0	3-4	R15

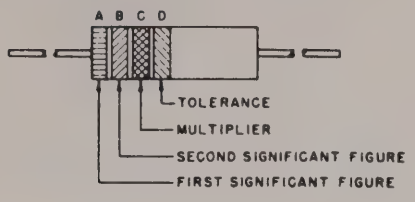
SOURCE CODE A	B	C	D	FEDERAL STOCK NUMBER	DESIGNATION BY MODEL	DESCRIPTION	UNIT OF ISSUE	EXP	QTY IN UNIT	MAINTENANCE ALLOWANCE DIRECT SUPPORT	GENERAL SUPPORT	DEPOT	ILLUSTRATION FIG NO.	ITEM NO.
						ME-254A/U (continued)								
		H		5905-171-2009		RESISTOR, FIXED COMPOSITION: RC20GF222K			2		*	4.0	3-4	R34 R38
		H		5960-503-4880		TUBE, ELECTRON: Type 0A2			1		*	20.0	3-4	V2
		H		5969-188-0873		TUBE, ELECTRON: Type 6AV6			1		*	20.0	3-4	V4
		H		5960-262-0167		TUBE, ELECTRON: Type 12AT7			2		*	40.0	3-4	V2 V5
		H		5960-729-6963		TUBE, ELECTRON: Type 6U8			1		*	20.0	3-4	V3
		H		5960-653-3482		TUBE, ELECTRON: Type 6AL5			1		*	20.0	3-4	V6
		H		5950-754-7331		TRANSFORMER: Varo part No. 75219			1		*	2.0	3-4	T-1
		H		5306-638-3298		SCREW: Pan head MS35223-30			4		*	4		H4
		H		5310-938-8483		WASHER, FLAT: MS15795-205			4		*	4		H5
		H		5910-726-2301		CAPACITOR, PADDER: 500 to 1400 uuf; Arco Elec part No. L308			1		*	2.0	3-4	C16
		H		5910-726-6010		CAPACITOR FIXED MICA, DIELECTRIC: 9300 mmfd, 1%; Arco part No. CM30E932FN3			2		*	4.0	3-4	C15 C4
		H		5910-726-5962		CAPACITOR, FIXED PAPER: 002 mfd, 600 v; Sprague Elec part No. type 160P			4		*	8.0		C6 C8 C18 C24
		H		5910-726-5947		CAPACITOR, FIXED, MICA: 680 mmfd, 1%; Arco part No. CM30B681FN3			1		*	2.0	3-4	C17
		H		5910-726-2304		CAPACITOR, PADDER: 450 to 1400 uuf; Arco part No. 308type 30			1		*	2.0	3-4	C5
		H		5910-726-5948		CAPACITOR, ELECTROLYTIC DUAL: 40 x 40 mfd, 250 v; Aevorox Corp. part No. AFH2-29			1		*	2.0	3-4	C1
		H		5905-192-9260		RESISTOR, FIXED COMPOSITION: 10% 150 k ohm 1/2 w MIL -R-11/3B; RC20GF154K			1		*	2.0	3-4	R30
		H		5905-195-6761		RESISTOR, FIXED COMPOSITION: 10%, 100 k ohm 1/2 w; MIL-R-11/3B; RC20GF104K			1		*	2.0	3-4	R-14
		H		5905-279-1722		RESISTOR, FIXED COMPOSITION: 10%, 1 k ohm, 1 w, MIL-R-11/6A; RC32GF102K			1		*	2.0	3-4	R2
		H		5905-577-7399		RESISTOR, FIXED, WIREWOUND: 3%, 2 k, 5 w; Dale Elec. type RS-5			1		*	2.0	3-4	R-1

SOURCE CODE A	B	C	D	FEDERAL STOCK NUMBER	DESIGNATION BY MODEL	DESCRIPTION	UNIT OF ISSUE	EXP	QTY IN UNIT	MAINTENANCE ALLOWANCE DIRECT SUPPORT	GENERAL SUPPORT	DEPOT	ILLUSTRATION FIG. NO.	ITEM NO.
						ME-254A/U (continued)								
		H		5905-759-3489		POTENTIOMETER: 2 megohm 20%; Chicago Tele of Calif part No. 34409 Series 45			3		*	6.0	3-4	R13 R29 R47
		H		5960-581-8066		SEMI-CONDUCTOR DEVICE, DIODE: Jetec Std. IN69A			2		*	6.0	3-4	CR5 CR6
		H		6625-755-6664		METER, MODULATION: Varo part No. 56857			1		*	2.0		M1
		H		6240-155-8706		LAMP, INCANDESCENT: GE part No.47			1		*	2.0		DS-1
	X1	H				LIGHT ASSEMBLY: 30413-FR2			1		*	4		X4
		H		5940-577-3695		POST BINDING: Grayhill part No. 29-1B			6		*	1.0	3-4	E-1 thru E-6
		H		5355-727-6894		KNOB: Davies part No. 1450BY			1		*	2.0	1-1	MP-4
		H		5355-584-5827		KNOB: Davies part No. 1470			3		*	6.0	1-1	MP5
	X1	H				JACK, PIN: Black 10540-1			1		*	4		J1
		H		5920-538-5986		FUSE: 1 amp 3 ag; Bussman part No. 93-01			1		*	2.0	3-4	F1
		H		5920-280-8338		HOLDER FUSE: 30427			1		*	4		X1
	X1	H				CORD, LINE, AC: 11038-01			1		*	4		W1
	X1	H				RELIEF, STRAIN, BLACK: 55066			1					MP6
	X1	H				SOCKET; 9 pin miniature 55122-2			3					X5,6,8
	X1	H				SOCKET; 7 pin miniature 55122-1			4					X2,4,7, 9
	X1	H		5940-685-9235		TERMINAL BOARD: 2 term. 56048-52			2		*	4		TB1
		H		5305-637-7079		SCREW; Panhead MS35223-26			16		*	16		H6
		H		5940-242-7950		TERMINAL BOARD: 56048-512			1		*	4		TB2
		H		5940-714-6287		TERMINAL BOARD: 56048-531			1		*	4		TB3
		H		5940-714-6287		TERMINAL BOARD: 56048-531			1		*	4		TB3

SOURCE CODE A	B	C	D	FEDERAL STOCK NUMBER	DESIGNATION BY MODEL	DESCRIPTION	UNIT OF ISSUE	EXP	QTY IN UNIT	MAINTENANCE ALLOWANCE DIRECT SUPPORT	GENERAL SUPPORT	DEPOT	ILLUSTRATION FIG. NO.	ITEM NO.
						ME-254A/U (continued)								
	X1	H				TERMINAL BOARD: three term. 56048-534			1		*	2		TB4
	X1	H				GORMMET; RUBBER: fits 3/8'' hole, 1/16'' thk 30206			3		*	3		MP7
	X1	H				GORMMET, RUBBER: Fits 1/2'' hole, 1/16'' thk 30205			1		*	2		MP8
		H		5905-763-4368		RESISTOR, FIXED, FILM: 1 meg ohm 1/2 w; Dale Elec part No. type DCS1/2			1		*	2.0	3	R-17
		H		5910-726-5953		CAPACITOR, FIXED, MICA DIELECTRIC: 820 mmfd 1%; CM30E822FN3			2		*	4.0	3-4	C4
		H		5910-991-6419		CAPACITOR, FIXED PAPER DIELECTRIC: .01 mfd, 600 v Sprague part No. type 160P			1		*	2.0	3-4	C19
		H		5915-754-7342		FILTER ASSEMBLY OSCILLATOR: Varo part No. 75205			1		*	5.0		FL1
		H		5915-754-7343		FILTER ASSEMBLY DISCRIMINATOR: Varo part No. 75206			1		*	5.0		FL2
	X1	H				PRINTED CIRCUIT BOARD ASSEMBLY: 75210			1		*	2		MP-9
	X1	H				SPACER HEX: 3/4 in lg, 6-32 NC-2B tapped; 56058-3			4		*	4		H7
	X1	H				CABINET, FLUTTER INDICATOR: 75509			1		*	2	1-1	MP10
	X1	H				FEET, RUBBER BLACK: 55119-1			4		*	4		MP11
	X1	H				WASHER, LOCK: MS355333-21			4		*	4		H8
	X1	H				NUT, PLAIN HEX: MS35649-82			4		*	4		H9
	X1	H				SCREW, SHEET METAL: MS24641-24			9		*	9		H10
	X1	H				HARDWARE KIT: FL-3D-KIT			1		*	2		H11

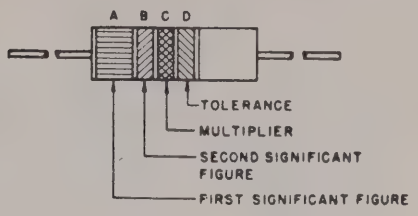
COLOR CODE MARKING FOR MILITARY STANDARD RESISTORS

COMPOSITION-TYPE RESISTORS



BAND A— Equal Width Band Signifies Composition-Type

WIREWOUND-TYPE RESISTORS

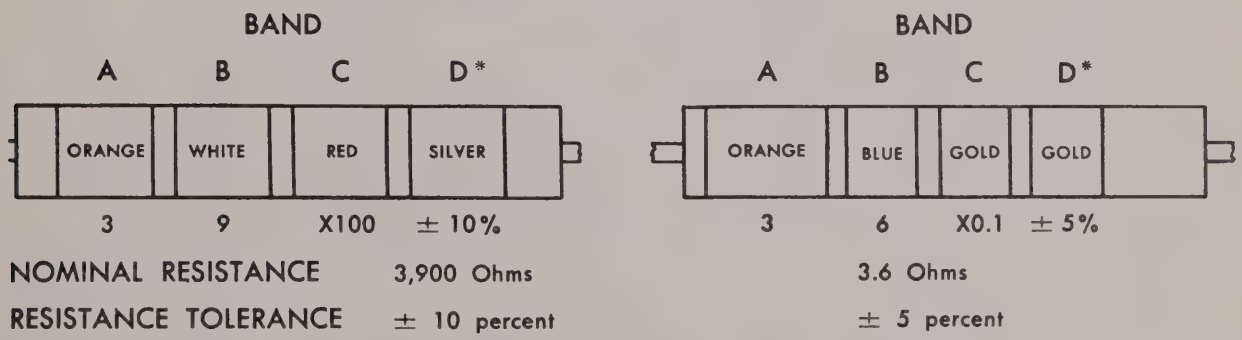


BAND A— Double Width Signifies Wire-wound Resistor

COLOR CODE TABLE

BAND A		BAND B		BAND C		BAND D*	
COLOR	FIRST SIGNIFICANT FIGURE	COLOR	SECOND SIGNIFICANT FIGURE	COLOR	MULTIPLIER	COLOR	RESISTANCE TOLERANCE (PERCENT)
BLACK	0	BLACK	0	BLACK	1		
BROWN	1	BROWN	1	BROWN	10		
RED	2	RED	2	RED	100		
ORANGE	3	ORANGE	3	ORANGE	1,000		
YELLOW	4	YELLOW	4	YELLOW	10,000	SILVER	± 10
GREEN	5	GREEN	5	GREEN	100,000	GOLD	± 5
BLUE	6	BLUE	6	BLUE	1,000,000		
PURPLE (VIOLET)	7	PURPLE (VIOLET)	7				
GRAY	8	GRAY	8	SILVER	0.01		
WHITE	9	WHITE	9	GOLD	0.1		

EXAMPLES OF COLOR CODING



NOMINAL RESISTANCE	3,900 Ohms	3.6 Ohms
RESISTANCE TOLERANCE	± 10 percent	± 5 percent

STD-R2

*If Band D is omitted, the resistor tolerance is ± 20%, and the resistor is not Mil-Std.

Figure 3-2.—Color code marking for MIL STD resistors.

COLOR CODE TABLES

l CB

CITANCE TOLERANCE			CHARACTERISTIC[2]				DC WORKING VOLTAGE	OPERATING TEMP. RANGE	VIBRATION GRADE
CN	CY	CB	CM	CN	CY	CB	CM	CM	CM
	± 20%	± 20%		A				−55° to +70°C	10–55 cps
			B	E		B			
	± 2%	± 2%	C		C			−55° to +85°C	
± 30%			D			D	300		
			E					−55° to +125°C	10–2,000 cps
			F				500		
								−55° to +150°C	
	± 5%	± 5%							
± 10%	± 10%	± 10%							

le CK

ACITANCE LERANCE	MIL ID
± 20%	
± 10%	
	CK

TABLE III – For use with Group III, Temperature Compensating, Style CC

COLOR	TEMPERATURE COEFFICIENT[4]	1st SIG FIG	2nd SIG FIG	MULTIPLIER[1]	CAPACITANCE TOLERANCE		MIL ID
					Capacitances over 10uuf	Capacitances 10uuf or less	
BLACK	0	0	0	1		± 2.0uuf	CC
BROWN	−30	1	1	10	± 1%		
RED	−80	2	2	100	± 2%	± 0.25uuf	
ORANGE	−150	3	3	1,000			
YELLOW	−220	4	4				
GREEN	−330	5	5		± 5%	± 0.5uuf	
BLUE	−470	6	6				
PURPLE (VIOLET)	−750	7	7				
GREY		8	8	0.01			
WHITE		9	9	0.1	± 10%		
GOLD	+100					± 1.0uuf	
SILVER							

SIG) figures are multiplied to obtain the capacitance in uuf.

e specifications: MIL–C–5, MIL–C–91, MIL–C–11272, and MIL–C–10950 respectively.

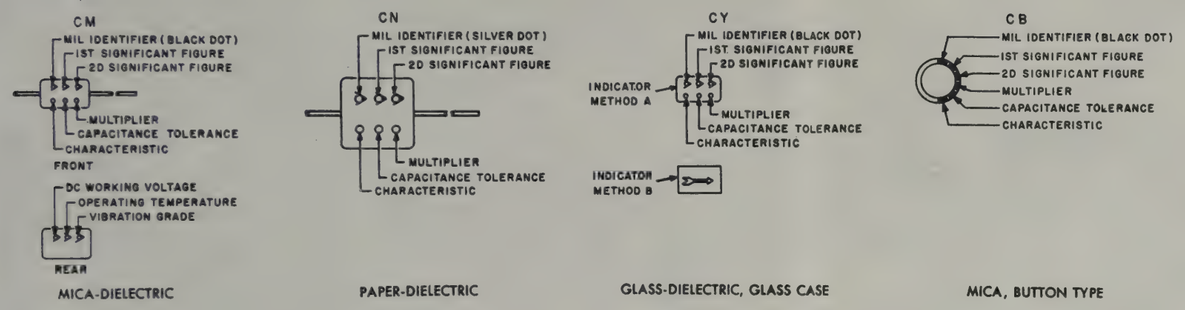
ature limits designated in MIL–C–11015.

ntigrade.

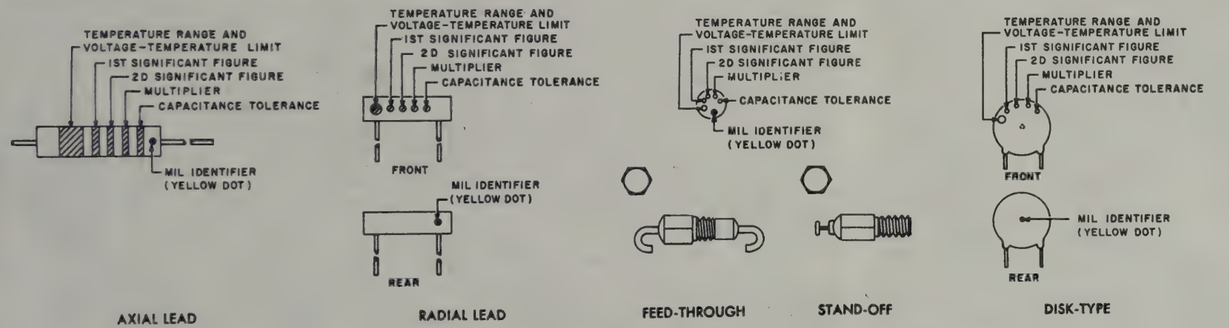
205–203 #5443A O - 65 (Face blank p. 26) No. 1

COLOR CODE MARKING FOR MILITARY STANDARD CAPACITORS

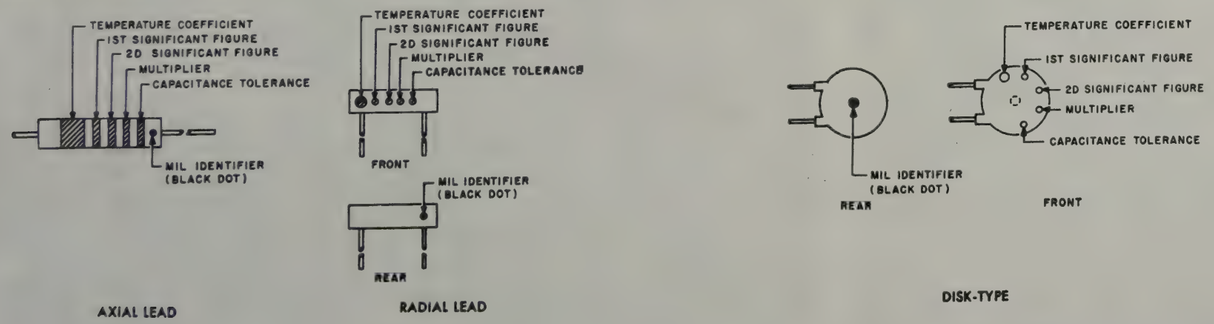
GROUP I Capacitors, Fixed, Various-Dielectrics, Styles CM, CN, CY, and CB



GROUP II Capacitors, Fixed Ceramic-Dielectric (General Purpose) Style CK



GROUP III Capacitors, Fixed, Ceramic-Dieletric (Temperature Compensating) Style CC



COLOR CODE TABLES

TABLE I – For use with Group I, Styles CM, CN, CY and CB

COLOR	MIL ID	1st SIG FIG	2nd SIG FIG	MULTIPLIER[1]	CAPACITANCE TOLERANCE				CHARACTERISTIC[2]				DC WORKING VOLTAGE	OPERATING TEMP. RANGE	VIBRATION GRADE
					CM	CN	CY	CB	CM	CN	CY	CB	CM	CM	CM
BLACK	CM, CY CB	0	0	1			± 20%	± 20%		A				−55° to +70°C	10–55 cps
BROWN		1	1	10					B	E		B			
RED		2	2	100	± 2%		± 2%	± 2%	C		C			−55° to +85°C	
ORANGE		3	3	1,000		± 30%			D			D	300		
YELLOW		4	4	10,000					E					−55° to +125°C	10–2,000 cps
GREEN		5	5		± 5%				F				500		
BLUE		6	6											−55° to +150°C	
PURPLE (VIOLET)		7	7												
GREY		8	8												
WHITE		9	9												
GOLD				0.1			± 5%	± 5%							
SILVER	CN				± 10%	± 10%	± 10%	± 10%							

TABLE II – For use with Group II, General Purpose, Style CK

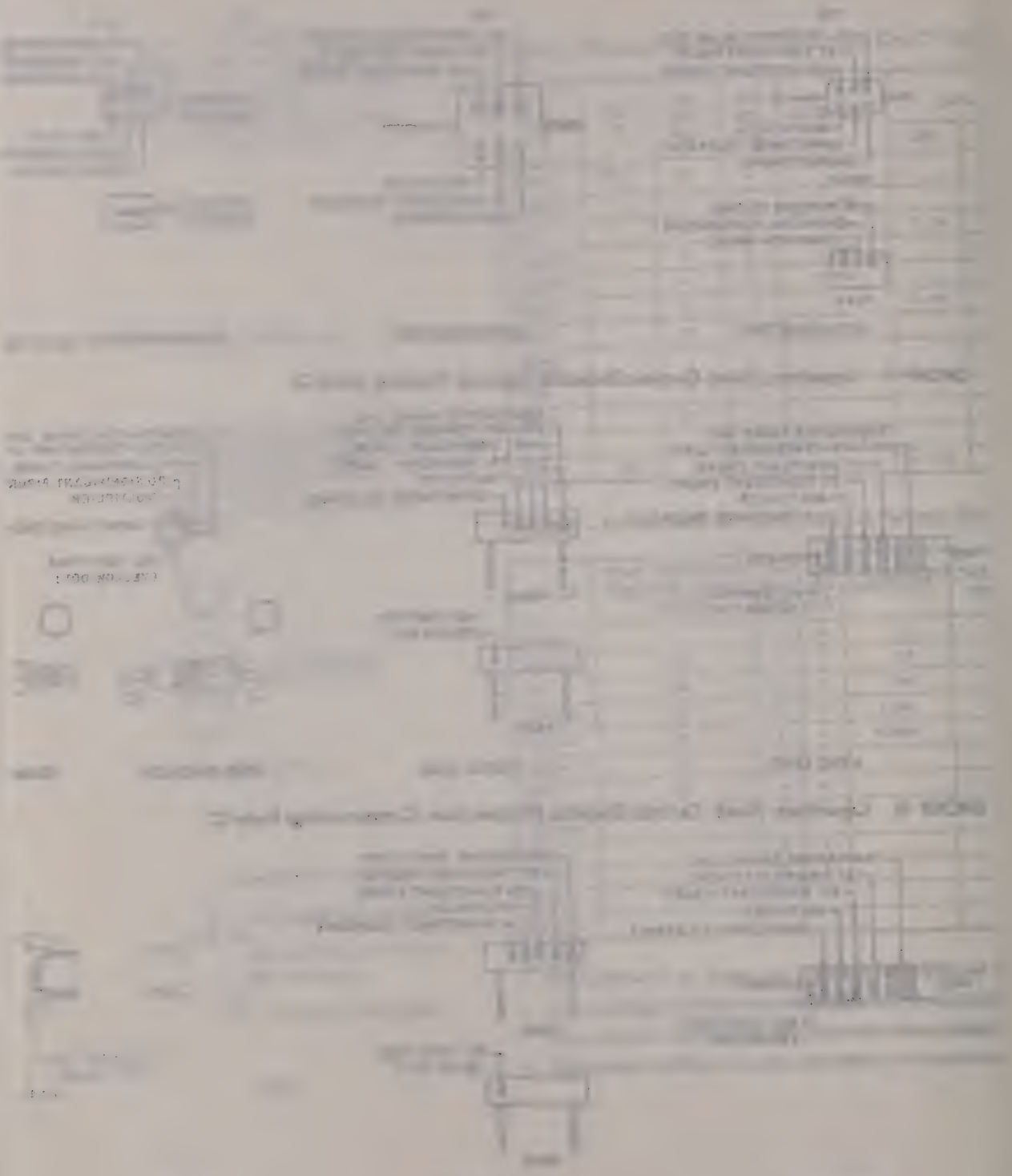
COLOR	TEMP. RANGE AND VOLTAGE – TEMP. LIMITS[3]	1st SIG FIG	2nd SIG FIG	MULTIPLIER[1]	CAPACITANCE TOLERANCE	MIL ID
BLACK		0	0	1	± 20%	
BROWN	AW	1	1	10	± 10%	
RED	AX	2	2	100		
ORANGE	BX	3	3	1,000		
YELLOW	AV	4	4	10,000		CK
GREEN	CZ	5	5			
BLUE	BV	6	6			
PURPLE (VIOLET)		7	7			
GREY		8	8			
WHITE		9	9			
GOLD						
SILVER						

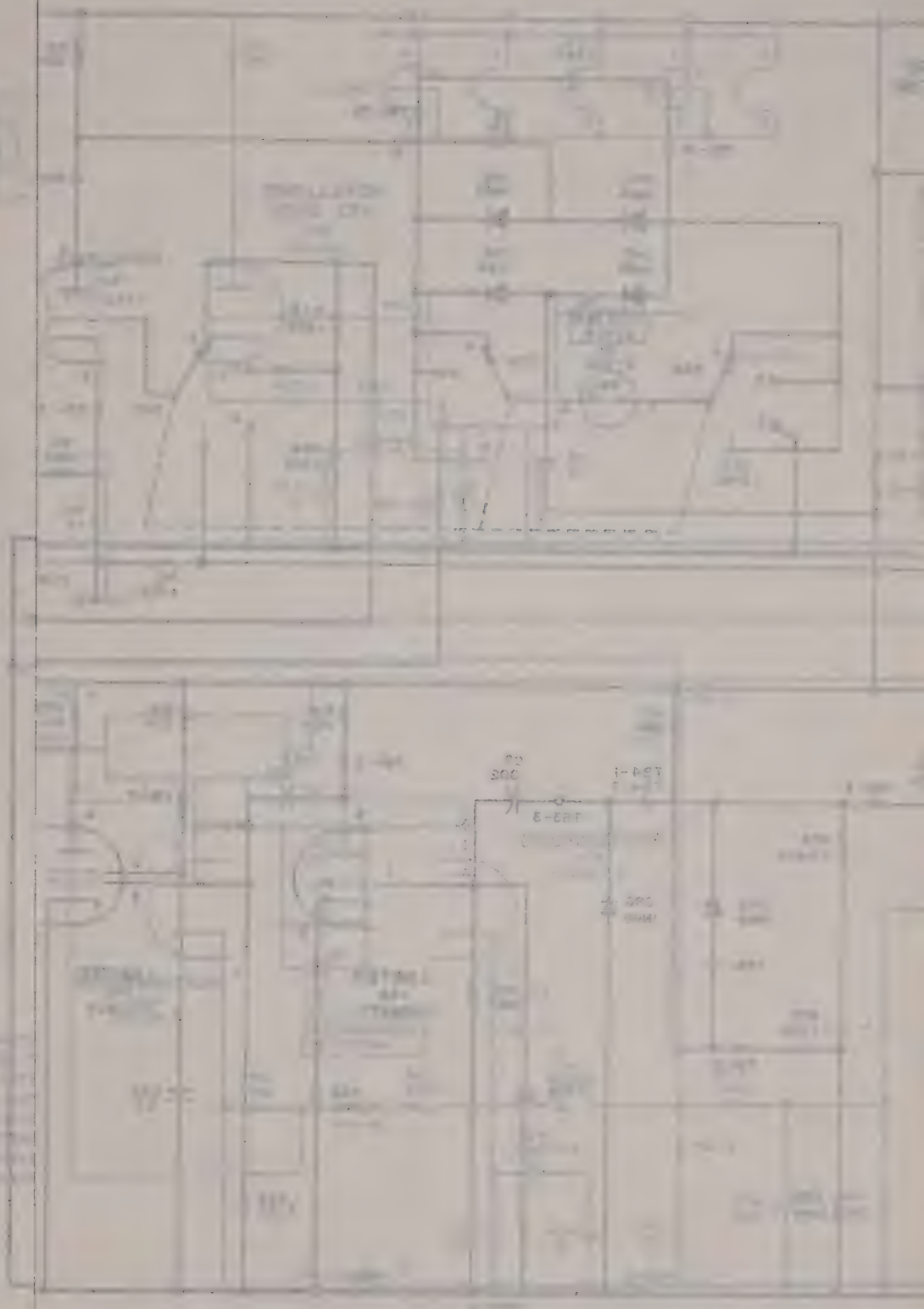
TABLE III – For use with Group III, Temperature Compensating, Style CC

COLOR	TEMPERATURE COEFFICIENT[4]	1st SIG FIG	2nd SIG FIG	MULTIPLIER[1]	CAPACITANCE TOLERANCE		MIL ID
					Capacitances over 10uuf	Capacitances 10uuf or less	
BLACK	0	0	0	1		± 2.0uuf	CC
BROWN	−30	1	1	10	± 1%		
RED	−80	2	2	100	± 2%	± 0.25uuf	
ORANGE	−150	3	3	1,000			
YELLOW	−220	4	4				
GREEN	−330	5	5		± 5%	± 0.5uuf	
BLUE	−470	6	6				
PURPLE (VIOLET)	−750	7	7				
GREY		8	8	0.01			
WHITE		9	9	0.1	± 10%		
GOLD	+100					± 1.0uuf	
SILVER							

1. The multiplier is the number by which the two significant (SIG) figures are multiplied to obtain the capacitance in uuf.
2. Letters indicate the Characteristics designated in applicable specifications: MIL–C–5, MIL–C–91, MIL–C–11272, and MIL–C–10950 respectively.
3. Letters indicate the temperature range and voltage-temperature limits designated in MIL–C–11015.
4. Temperature coefficient in parts per million per degree centigrade.

Figure 3–3.—Color code marking for MIL STD capacitors.

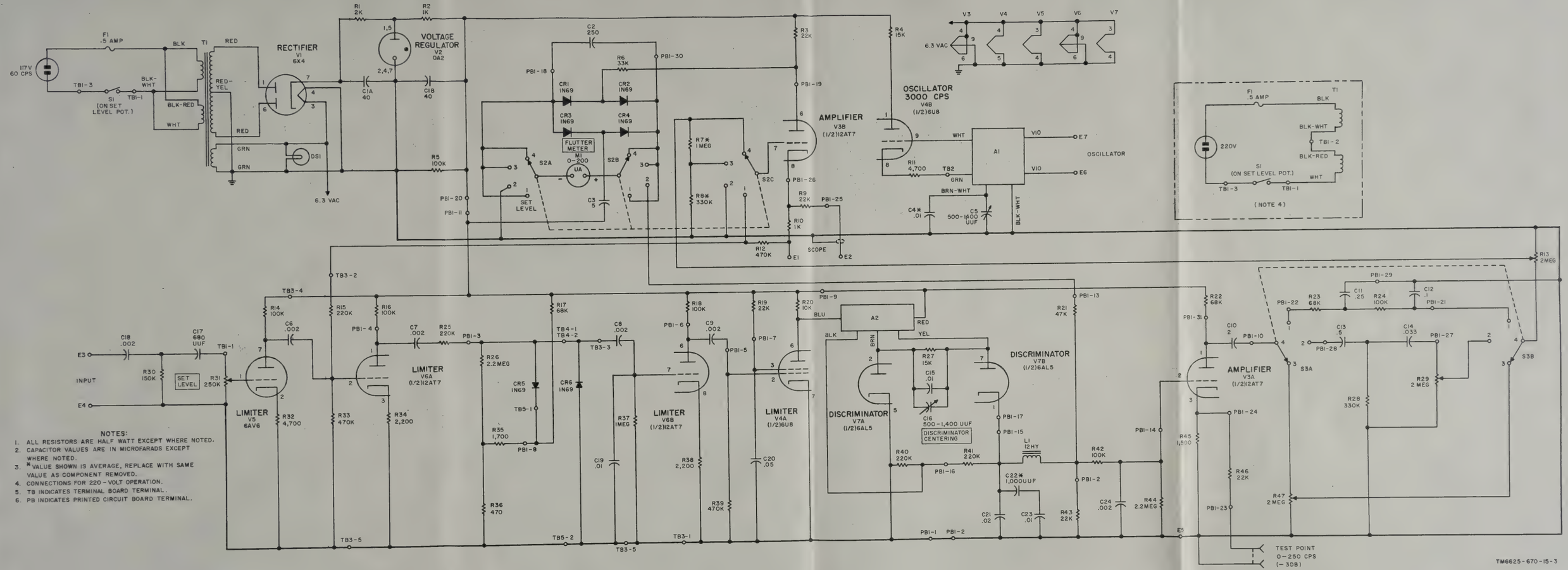




60

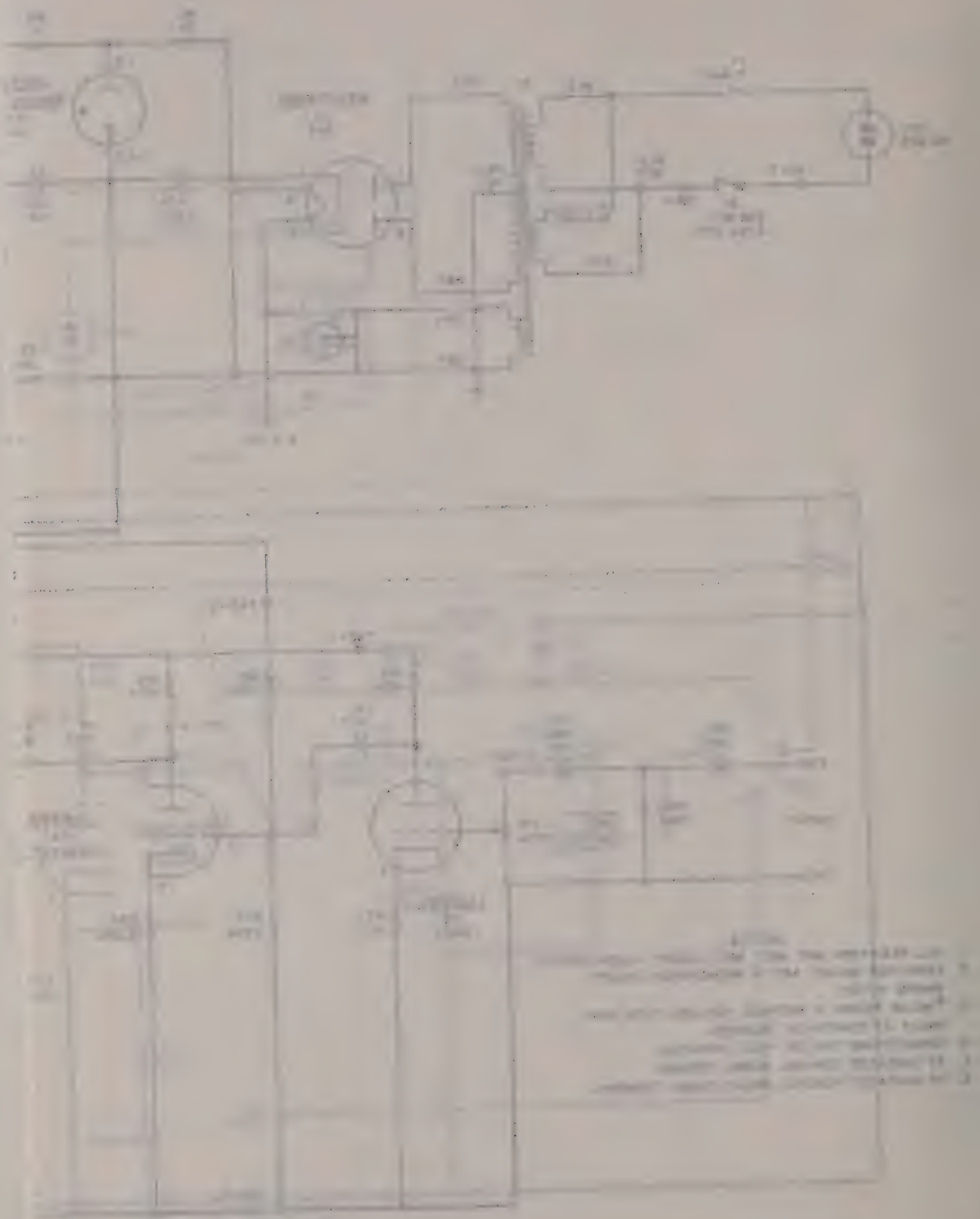
1.
2.
3.
4.
5.
6.

205-203 #5443A O - 65 (Face blank p. 26) No. 2



NOTES:
1. ALL RESISTORS ARE HALF WATT EXCEPT WHERE NOTED.
2. CAPACITOR VALUES ARE IN MICROFARADS EXCEPT WHERE NOTED.
3. * VALUE SHOWN IS AVERAGE, REPLACE WITH SAME VALUE AS COMPONENT REMOVED.
4. CONNECTIONS FOR 220-VOLT OPERATION.
5. TB INDICATES TERMINAL BOARD TERMINAL.
6. PB INDICATES PRINTED CIRCUIT BOARD TERMINAL.

Figure 3-4.—Meter, Flutter and Wow ME-245 A/U, schematic diagram.



By Order of the Secretary of the Army:

HAROLD K. JOHNSON,
General, United States Army,
Chief of Staff.

Official:
J. C. LAMBERT,
Major General, United States Army,
The Adjutant General.

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USACDCCEA, Ft Monmouth (1)
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USACDCOA (1)
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USACDCTA (1)
USACDCADA (1)
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USASCC (4)
USA Tml Comd (1)
11th Air Assault Div (3)
Svc Colleges (2)
Br Svc Sch (2)
USASCS
USATC AD (2)
USATC Armor (2)
USATC Engr (2)
USATC Inf (2)
USASTC (2)
WRAMC (1)
USA Pic Cen (2)
Instl (2) except Ft Monmouth (70)
Ft Hancock (4) Ft Gordon (10)
Ft Huachuca (10) WSMR (5)
Ft Carson (19)
Army Dep (2) except LBAD, TOAD (14) SAAD (30) FTWOAD (10) LEAD, NAAD, SVAD (5) ATAD (4) SHAD, CHAD (3)
GENDEP (2)
Sig Sec, GENDEP (5)
Sig Dep (12)
Army Tml (1) except OART (5)
Sig Fld Maint Shops (2)
AMS (1)
USAERDAA (2)
USAERDAW (13)
Units organized under following TOE's (2 each unless otherwise indicated):
11–16
11–57
11–97
11–98
11–117
11–155
11–157
11–337
11–500 AA–AE (4)
11–587
11–592
11–597

NG: None.

USAR: None.

For explanation of abbreviations used, see AR 320–50.

U.S. GOVERNMENT PRINTING OFFICE : 1965 O—205-203—(5443A)

Change No. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C., *30 July 1973*

Organizational, Direct Support, General Support and Depot Maintenance Manual Including Repair Parts and Special Tool Lists METER, FLUTTER AND WOW ME-254A/U

TM 11-6625-670-15, 26 July 1965, is changed as follows:

Page 3. In paragraph 1-1*b* delete "The basic issue items list is in appendix II."

Paragraph 1-2. Paragraph 1-2 is superseded as follows:

1-2. Indexes of Publications

a. DA Pam 310-4. Refer to the latest issue of DA Pam 310-4 to determine whether there are new editions, changes, or additional publications pertaining to the equipment.

b. DA Pam 310-7. Refer to DA Pam 310-7 to determine whether there are modification work orders (MWO's) pertaining to the equipment.

Paragraph 1-3. Paragraph 1-3 is superseded as follows:

1-3. Forms and Records

a. Reports of Maintenance and Unsatisfactory Equipment. Maintenance forms, records, and reports which are to be used by maintenance personnel at all maintenance levels are listed in and prescribed by TM 38-750.

b. Report of Packaging and Handling Deficiencies. Fill out and forward DD Form 6 (Report of Packaging and Handling Deficiencies) as prescribed in AR 700-58 (Army)/NAVSUP PUB 378 (Navy)/AFR 71-4 (Air Force)/and MCO P4030.29 (Marine Corps).

c. Discrepancy in Shipment Report (DISREP) (SF 361). Fill out and forward Discrepancy in Shipment Report (DISREP) (SF 361) as prescribed in AR 55-38 (Army)/NAVSUP PUB 459 (Navy)/AFM 75-34 (Air Force)/and MCO P4610.19 (Marine Corps).

Add paragraphs 1-4 and 1-5:

1-4. Reporting of Equipment Publication Improvements

The reporting of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to Publications) and forwarded direct to: Commander, US Army Electronics Command, ATTN: AMSEL-MA-S, Fort Monmouth, NJ 07703.

1-5. Items Comprising the Operable Meter, Flutter and WOW ME-254A/U

The Meter, Flutter and Wow ME-254A/U (FSN 6625-987-8527) comprises the operable end item. The ME-254A/U is illustrated in figure 1-1.

Page 14. Delete appendix II in its entirety.

By Order of the Secretary of the Army:

CREIGHTON W. ABRAMS
General, United States Army
Chief of Staff

Official:
VERNE L. BOWERS
Major General, United States Army
The Adjutant General

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ARADCOM (2)
ARADCOM Rgn (1)
OS Maj Comd (2)
USACDCEC (10)
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Armies (1)
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WSMR (1)
Ft Carson (7)
USAERDAA (1)
USAERDAW (1)
Army Deps (1) except:
LBAD (10);
SAAD (30);
TOAD (14);
LEAD (4);
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USA Dep (1)
Sig Sec USA Dep (3)
Sig Dep (3)
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Ft Richardson
(ECOM Ofc) (2)
Corps (2)
Units org under fol TOE
(1 copy each unit):
11-95;
11-96;
11-117;
11-127;
11-500 (AA-AC);
11-158;
29-134;
29-427;
29-500.

NG: None
USAR: None
For explanation of abbreviations used, see AR 310-50.

☆ U.S. GOVERNMENT PRINTING OFFICE: 1973-768109/108